Reviewer’s report

Title: Impact of duration of structured observations on measurement of handwashing behavior at critical times

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Reviewer: Katie Greenland

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General Comment: Overall, I find this manuscript very well written. Points that I was hoping for further explanation on were almost all addressed at some stage in the manuscript (e.g. discussion of why observation of faecal contact may have been reduced by short observation sessions). The rationale for each decision made (methods, choice of analysis, etc.) was clearly reasoned.

Major Compulsory Revisions:

1. Timing of short and long observations
   The discussion (P4) mentions that: “It is possible that restricting both long and short observations to particular times of day may have generated results that were more similar between 5-hour and 90 minute observations”. I was looking for some mention of this, but this statement does not give me enough explanation of why this wasn’t done – I would have thought it is quite important to look at the same time period if you wish to draw conclusions about whether 5 hour sessions can be replaced by 90 minute sessions. For my work it would have been useful to know whether 90 minute observations between say 6:00 and 7:30 are significantly worse than a 5 hour observation session beginning at 6am. I would like the discussion to make more of this.

2. Results final paragraph and Discussion P1/2.
   Results: “Within long observation households, handwashing with soap at all critical times and overall was higher in the initial 90 minutes than the remaining 210 minutes of observation except the opportunities of serving food (Figure 1b and Table 3). Notably, handwashing without soap was less frequent in the initial 90 minutes than in the remaining 210 minutes for all opportunities, except for feeding a child.” Discussion: “We found handwashing with soap at critical times during the first 90 minutes were comparatively higher than the soap use during the remainder of the observation, although statistical significance was not demonstrated likely due to the small sample size. However, during the latter 210 minutes of observation, we observed more frequent handwashing with water alone than expected before food preparation and food serving opportunities.”
   After reading these results I was looking for some more explanation / speculation in the discussion, but the discussion of these findings comes much later (P3 beginning “Even with the limited...”). If it would work, consider reordering the discussion and giving more detail in P3.
Minor Essential Revisions:

1. Discussion P3, Phrasing. “In the short observation households, caregivers may not have needed to defecate during the short duration between their morning toileting and the completion of the observation.” To me this sentence doesn’t quite make sense. Please read over the wording and edit if you agree.

2. Methods P1 and Results P1.
The start times for the short and long observations quoted in the methods and results do not match, which is understandable if planned start times were not realised, but the wording used here leaves room for speculation.

Methods: “In the long observation group, we started 5-hour structured observations between 9:00 am and 11:00 am”; Results: “The field team started long observations between 9:00 am and 12:00 noon”

Please check wording for all timings reported and phrase slightly differently in the methods and/or results.

3. Methods P1 and Results P1. I would like to see more explanation in the discussion of why there is such large variation between start times for observation when the study was conducted in six villages. The discussion (P2) mentions logistical difficulties meant that observation had to start later in the day than one might have liked, but I don’t see why a set start time couldn’t be agreed even if it was later in the day (or was it not desired)?

Discretionary Revisions:

1. Discussion P3, omitting early observations from analysis. Is it possible to speculate on how much observation time should be omitted? How could this affect the likelihood of capturing defecation events that may have only been observed during the earliest part of an observation session?

2. The discussion rightfully notes that some events may have been missed by not observing early in the morning (P4). I would like to see brief mention of i) how someone planning structured observation might determine the optimum timing for observation (i.e. they need to first have a good idea of when they expect the events of interest to take place) and ii) how you could have got around the logistical difficulties that prevented early morning observation (e.g. if it was culturally acceptable, observers could have stayed in the household the night before observation).

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:

I declare that I have no competing interests.